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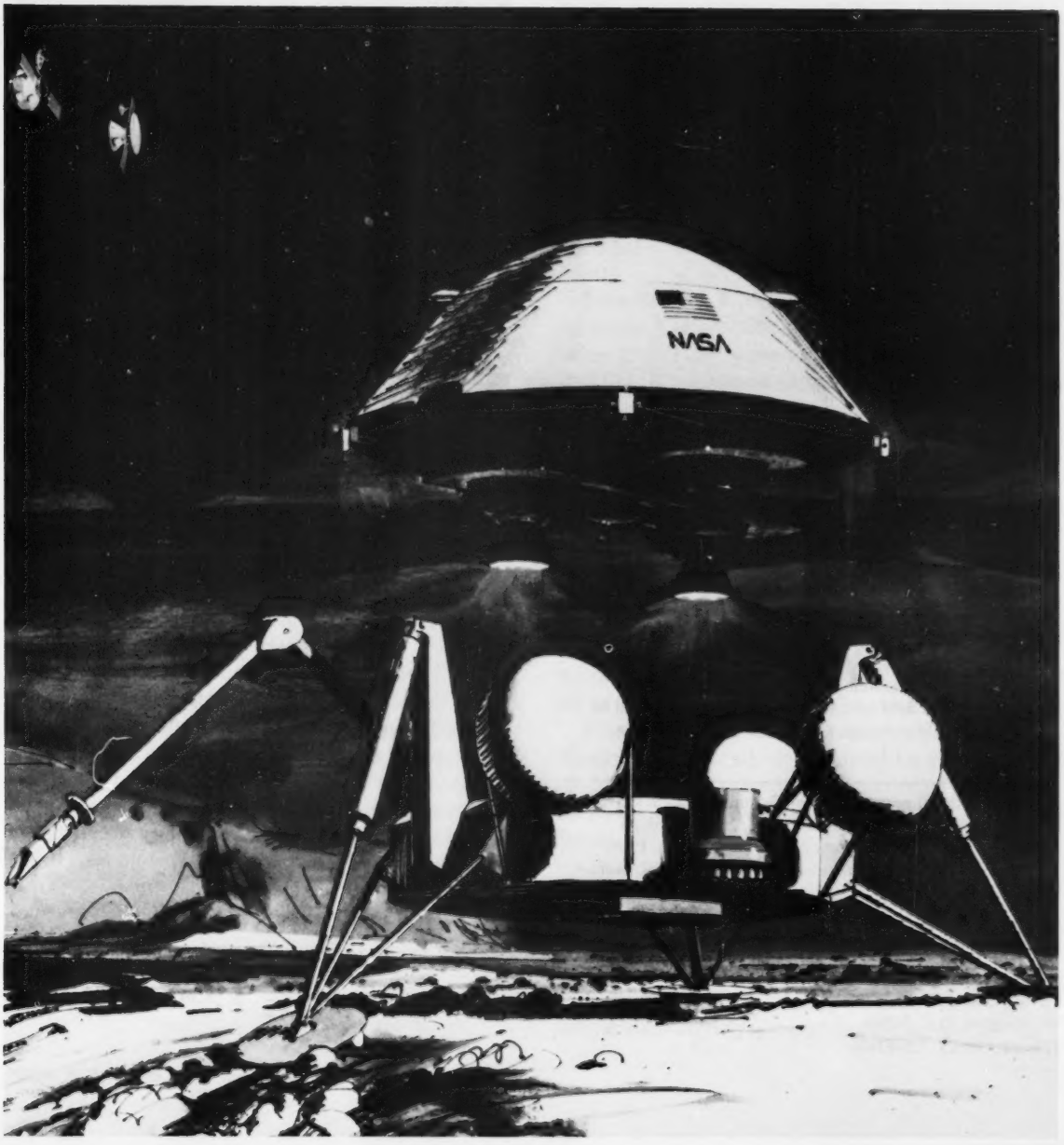

COVER

A Piece of Mars—The painting shows a proposed Mars Ascent Vehicle as it lifts off the surface of the Red Planet to deliver a soil sample to Earth for analysis. A mission study, performed for NASA by the Jet Propulsion Laboratory, was based on a rendezvous in Mars orbit, similar to the lunar orbit arrangement used by Apollo. A lander vehicle would touch down and pick up a sample of soil. The lander base would be left behind. The return vehicle, a three-stage craft, would fly to a 500-kilometer orbit around the planet. In the painting, at above left, are the carrier orbiter and a rendezvous/return orbiter. After the surface mission is complete, the rendezvous/return vehicle would remove the soil sample from the ascent craft and bring it back to Earth.

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Letter from Washington

Dear Colleagues:

As everyone at NASA knows, our agency is currently involved in a concerted drive to complete the development of the Shuttle and to launch Columbia on the first orbital test flight in March. This effort necessarily has our highest priority, since a successful, operational Shuttle is central to our entire national effort in space through the remainder of the century. But in the concentration of our attention, time and labor on the Shuttle program, it is important for us to remember, first, that we do other vitally important things—we are not a one-shot, single program agency—and, second, that the Shuttle is not an end in itself but an advanced tool which will permit us to do better what we are now doing in space and which will enable us to do things there that we cannot do today.

One of the things Shuttle will enable us to do better is space science, an area in which we already hold uncontentested and recognized world leadership. Galileo, VOIR, and Space Telescope, to name only three programs, all depend on the Shuttle for eventual success. We can find pride and encouragement in the fact that the fiscal year which is just beginning will see not only our first manned launch since 1975, but the two dramatically important Voyager encounters with Saturn as well, one only a month away, the other in late summer.

Thus, while it is important that we achieve for our our country the ability to fly off and back on to our planet at will, with all the benefits that capability will bring, it is equally important that we utilize that ability to continue and expand our efforts to probe the solar system and the universe in search of the knowledge mankind has always needed and on which his long-term future may well depend.

Sincerely,

Robert A. Frosch

Briefing Series on Space Transportation

NASA began a comprehensive series of media briefings on the development and utilization of the nation's Space Transportation System on Sept. 10 at NASA Headquarters in Washington. The series will continue throughout the initial flight testing of Columbia, the first Space Shuttle in the fleet of new Earth-orbiting vehicles the United States will fly to and from space in the 1980's.

The subject of the first briefing was "Technological Innovation in the Design and Development of the Space Shuttle." NASA Administrator Dr. Robert Frosch presented an overview of the technological innovation required in order to design the country's first generation of reusable space vehicles. He identified and described the major advances required by the transition from the country's expendable Saturn launch vehicle capability, developed for the Apollo program, to the first generation of reuseable Space Shuttle vehicles, and reviewed how NASA and its contractors have organized and conducted the various activities associated with those efforts.

John Yardley, NASA's Associate Administrator for Space Transportation Systems, reviewed the status of the Shuttle development program in general; discussed the current status of significant technological requirements; and outlined the schedule NASA must achieve in order to meet the planned launch date for the Columbia's first flight in March 1981.

Subsequent briefings will be held at two- to three-week intervals at the most appropriate location among the various NASA centers involved in the development of the Space Transportation System. Officials will describe the use of on-board and ground-based computer technology and data processing required for the guidance, navigation and orbital activities of the new generation of piloted spacecraft.

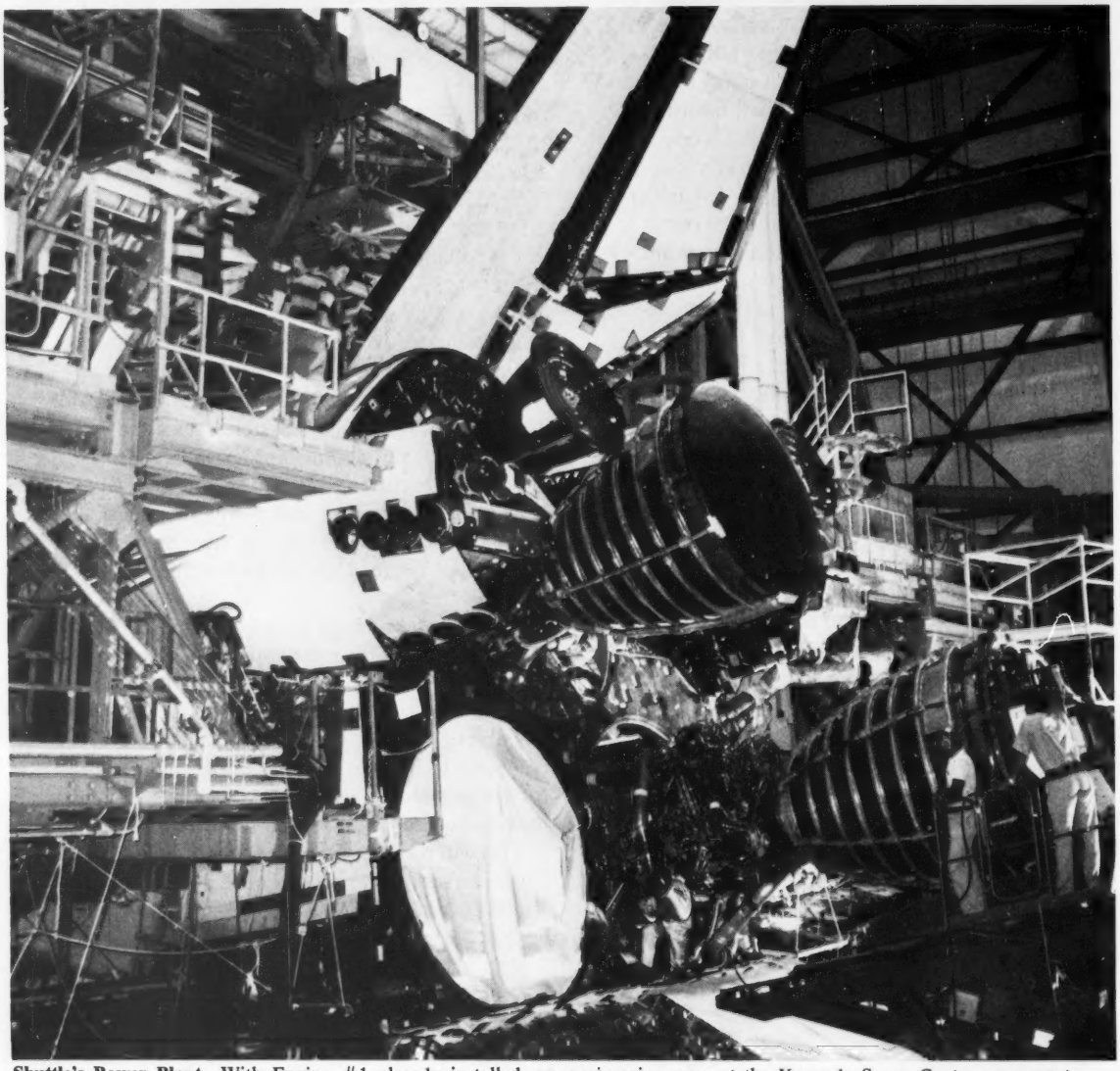
This will be followed by another briefing at NASA Headquarters, tentatively scheduled for early October, on the government/industry partnership which has been required to develop a Space Transportation System for the United States.

Other subjects during the next six months will include plans for the utilization of the Space Transportation System as a new national resource by NASA, other government agencies and private industry; descriptions of the various components of the system such as the orbiter, the main engine, the orbital maneuvering system, the payload bay and the

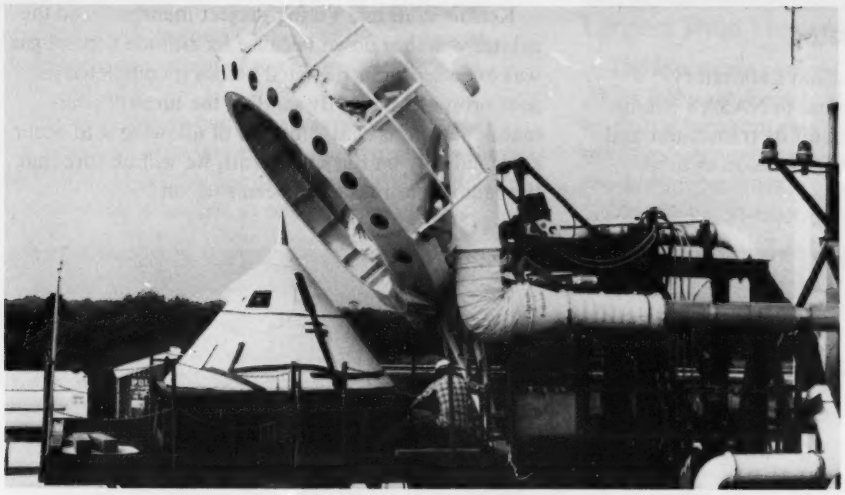
thermal protection system; detailed discussion of crew training and crew activities in flight; launch and landing operations; flight operations; flight readiness activities and mission verification testing; and the flight plan for STS-1, the first orbital flight test.

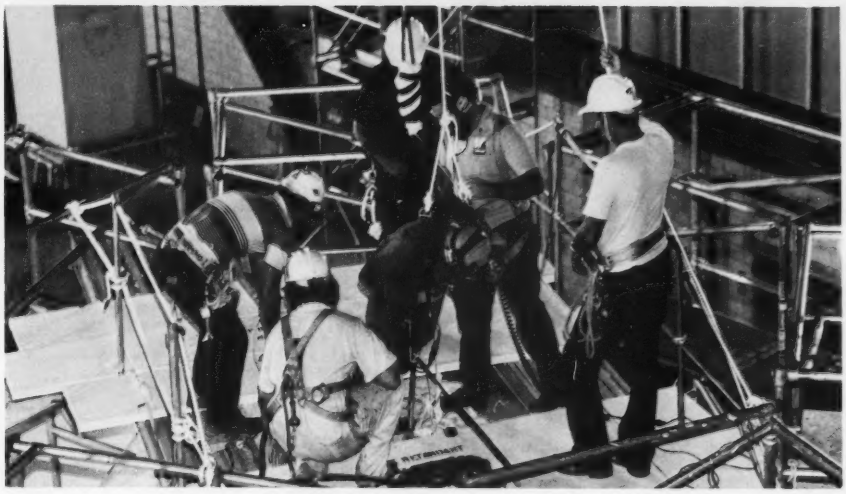
During these briefings, news centers at Kennedy Space Center, Fla.; Johnson Space Center; Marshall Space Flight Center, Huntsville, Ala.; and NASA Headquarters are linked by audio circuits so that media representatives may listen to the discussion and question the participants from any of those locations.

All of the sessions are on the record, for attribution. Transcripts will be published to provide a printed collection of reference material for media representatives who cover Space Transportation System activities. And a written status report on the progress of technological developments and other flight preparations is available at each briefing.



Shuttle's Power Plant—With Engine #1 already installed, an engineering crew at the Kennedy Space Center prepares to guide Engine #3 into the aft end of the Shuttle orbiter Columbia. The three main engines that will power the Columbia into space on its maiden voyage have been reinstalled following modifications and successful recertification firings at the NSTL facility in Mississippi. The engines were pulled earlier this year for modifications of the high pressure turbopumps, valves and nozzles.





Aiming for March—With the Shuttle launch date confirmed, preparations intensify at the Kennedy center. At KSC's Launch Equipment Test Facility (upper), technicians perform fit checks on a full scale mockup of the so-called "beanie cap". The device will remove cold oxygen vapors from the external tank top shortly before launch. In the Vehicle Assembly Building (center), an engineer is lowered into the aperture of a solid rocket booster forward segment to inspect for cracks and other defects. At a small pond south of the Shuttle Landing Faciliy (lower), personnel practice emergency water rescue operations using a mannequin to simulate an astronaut crewmember.

Viking Orbiter 1 Terminated

Engineers at the Jet Propulsion Laboratory, Pasadena, sent a radio command to NASA's Viking Orbiter 1 in August, switching off its transmitter and ending the spacecraft's four-year mission in orbit around Mars.

Kermit Watkins, Viking project manager, said the orbiter was shut down because its attitude control gas was expected to be depleted before it completed its next orbit of Mars. "By sending the turn-off command," Watkins said, "instead of allowing it to occur automatically on the space craft, we will be sure that the radio transmitter has been shut off."

An artist depicts the Viking Orbiter scanning the surface of Mars

Although silent, the spacecraft will continue to orbit Mars well beyond the turn of the century to prevent contamination of the planet's surface for future missions.

Viking engineers had been carefully monitoring the spacecraft since late July in the expectation that it would soon use the last of its attitude control gas and therefore be unable to maintain the correct orientation. Attitude control gas keeps the spacecraft's radio antenna pointed to Earth and the power-producting solar panels aimed at the Sun.

Viking 1 was launched on Aug. 20, 1975, from Cape Canaveral, Fla., and achieved Mars orbit on June 19, 1976. It had been operating continuously since then.

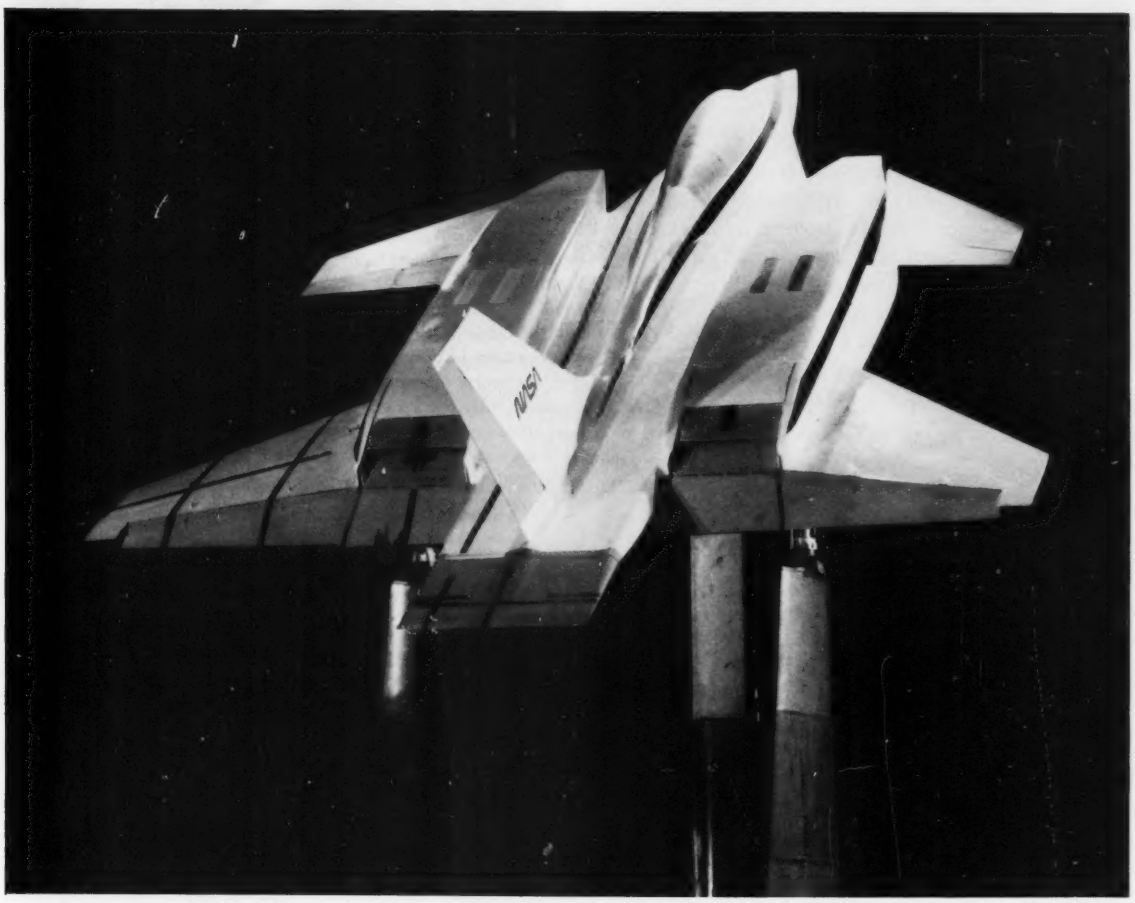
Viking Lander 1 continues to collect scientific information on the surface of Mars. It is programmed to transmit to Earth, weekly when interrogated, until December 1994.

Largest Wind Tunnel Closed

The free world's largest wind tunnel, at NASA's Ames Research Center, Mountain View, Calif., will be closed for about one year for an $85-million modification project which will greatly increase its research capabilities.

The 12-by-24-meter tunnel has been in almost continuous use since its completion in 1944 and has made important contributions to the development of vertical takeoff and landing concepts, powered lift concepts, rotary wing concepts and many military and civil conventional takeoff and landing aircraft.

The major modification is the addition of a 183-m long structure extending northwest from the west side of the present structure. The new structure, or leg, will house a new larger test section—24 by 27 m —and will have a bell-shaped air intake 110 m wide and 40 m high.



Scale model of a supersonic fighter in the huge Ames wind tunnel

The six 6,000-horsepower electric motors which have powered the wind tunnel since 1944 will also be replaced, with modern 22,500-hp units, raising the maximum wind tunnel drive power from the present 36,000 hp to 135,000 hp.

The additional power will increase the top speed available in the present test section from 370 kilometers per hour to 555 km/hr, and will provide test speeds in the new larger test section of up to 185 km/hr. The present fixed-pitch fans will be replaced with slower turning variable-pitch fans.

A major effort in the design of the modification has been to keep the amount of noise generated by the facility to an absolute minimum. Special low-speed fans will be employed and extensive acoustic treatment is planned at both the intake and exit of the new test leg. Engineers expect that the modified facility will generate no more noise than is presently generated, and that the noise which is generated will be less objectionable because there will be no continuous tones.

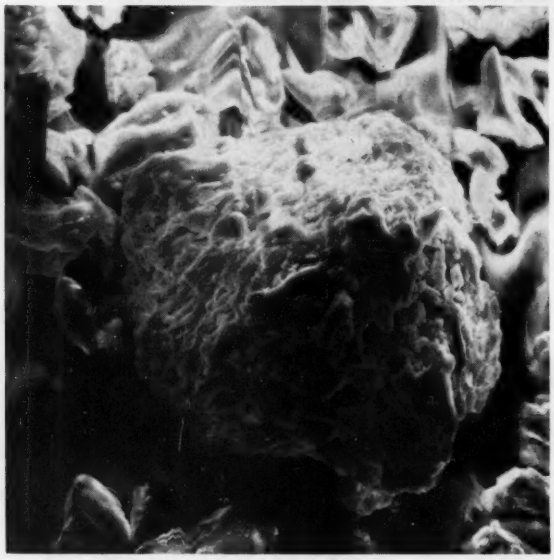
The new facility is expected to make important contributions to research programs to develop the next generation of aircraft which will fly much more quietly and efficiently than today's models.

The increased capabilities of the modified facility will help meet the critical need for testing full-scale aircraft systems under simulated flight conditions. As the trend continues toward the development of aircraft and helicopters of increasing size and complexity, it has become increasingly difficult to accommodate them in existing wind tunnel facilities.

An important use of the new facility will be for low-speed testing of aircraft with engines operating. Such studies are important in reducing aircraft noise during landings and takeoffs, in developing high-lift systems to reduce takeoff and landing distance, and in improving flight performance of airplanes in congested terminal areas.

The modified facility will essentially be two complete wind tunnels which share a common drive system. The 12-by-24-m test section will operate as always, except for the increased speeds available. Airflow through the new 24-by-37-m test section will enter through the intake at the end of the leg, flow through the test section and drive systems, and exhaust through vanes which will be installed in the south wall of the existing structure. Since both test sections share the common drive system, it won't be possible for both test sections to operate simultaneously.

Total cost of the modification project, $85 million, represents only a small portion of the cost to build an entirely new wind tunnel. Shutdown of the 40 by 80 circuit is expected to be complete in mid-July 1981. The compelte facility is expected to be fully operational in early 1982.



Volcanic Ash Amplified—The closeup is of a large dust particle from Mount Saint Helens, picked up after one of the summer eruptions. Magnification is 541 times the actual size and it was accomplished by the scanning electron microscope in the Goddard Space Flight Center's Parts Analysis Laboratory at Greenbelt, Md. Assistant engineer Diane Casper of the Sperry Support Service Group made the picture, using a miscroscope normally employed to inspect spacecraft circuitry and flight systems components. The volcanic ash is a crystaline structure of predominant silicon composition, with traces of sulphur, calcium, potassium and a vestige of iron.

One Magazine's Comment

In a recent edition of Government Executive magazine, the Publisher's Note column was entirely devoted to the space agency. Here, in part, was what it said:

A remarkable publication just came out of the National Aeronautics and Space Administration called Spinoff 1980. It is an annual thing and describes, with devastating effectiveness, the incredible wealth generated and dropped into the U.S. economy by a relatively tiny Federal agency with a petty cash annual budget.

How many of us have heard over and over again, in living color on our TV sets, spokesmen for the nation's poor—in fashionable three-piece suits—ranting about "If we can land a man on the Moon Etc." You can fill the rest of the speech in yourself. The point is that little of the public funds used to get to the Moon stayed on the Moon. Over 99.999% was spent right here in the States. And since that program started almost twenty years ago, the so-called spinoffs have literally changed our way of life. Now NASA is struggling to get Space Shuttle off the ground—and if that agency has problems it is because, as usual, they are living on the final edge of human knowledge and ability. It is not because of graft, inept management, bureaucratic inertia and the other hallmarks of the rest of government . . . . . Here then is this agency called NASA that has long been the envy of the rest of government because of its uncanny ability to explain to the taxpayer exactly what it is doing and why—and then goes on and does it.

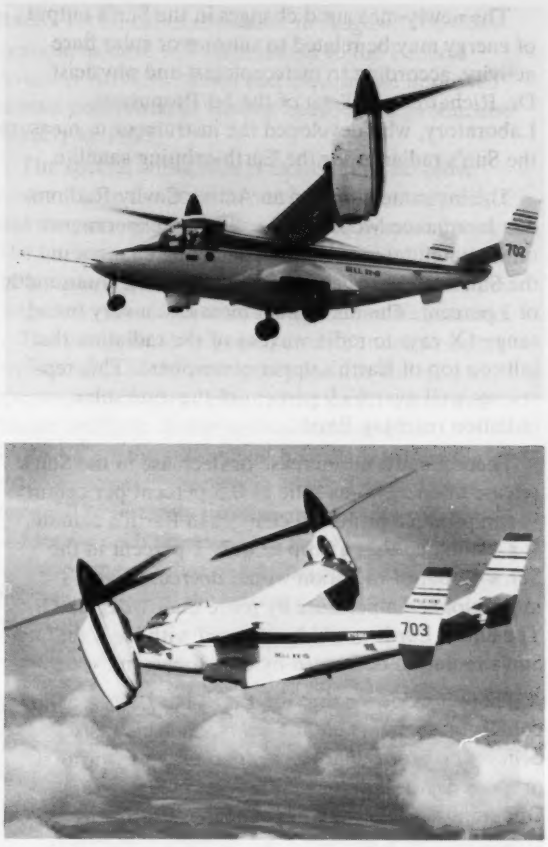
Dryden Receives Tilt-Rotor Plane

A new airplane that can take off and land like a helicopter and cruise in flight like a conventional aircraft was delivered to Dryden Flight Research Center in August.

Two XV-15 Tilt Rotor experimental aircraft were built for NASA and the U.S. Army by Bell Helicopter, Textron, Fort Worth, Texas. The second XV-15 aircraft is at NASA's Ames Research Center, Mountain View, Calif., preparing for research flight tests.

Because the XV-15 is capable of tilting its two wingtip mounted engines and rotors from the vertical to the horizontal position, the aircraft can fly as a helicopter, a short takeoff and landing aircraft, a conventional aircraft in forward flight or any combination of the three. Thus the aircraft can take off vertically as a helicopter and convert to the conventional aircraft mode in flight and gain the high-speed performance advantages of conventional aircraft.

The XV-15 aircraft received their initial flight tests at the Bell facility. The models delivered to NASA Dryden will be used to expand performance limits by NASA, military and contractor pilots. Then, the XV-15 aircraft at NASA Ames will be flown within these limits to perform specific research objectives. The flight program at Dryden is expected to last approximately one year.



DFRC's New Acquisition—By tilting its wingtip mounted engines and propellors, the XV-15A can take off like a helicopter and cruise like a conventional aircraft. The experimental craft is now at the Dryden center for a year of intensive testing.

Changes in Sun's Energy Noted

Using a measuring device flown in space for the first time, a NASA satellite has detected small changes —over periods of days to months—in the brightness of the Sun. Even the slightest change in the amount of light and heat energy emitted by the Sun is important because if a trend were to continue for several years, it could produce major alterations in the Earth's climate. Measurement of such trends might enable scientists to predict future climate changes.

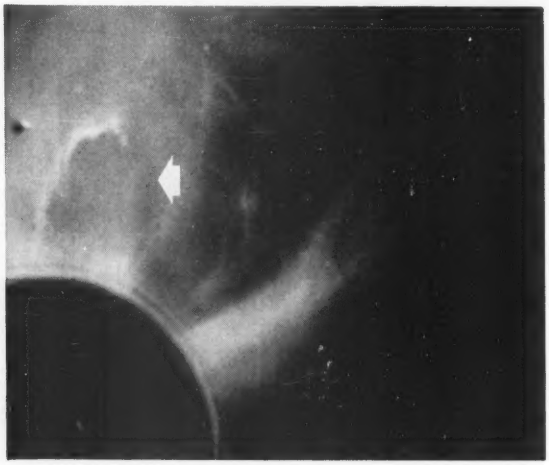
Fluctuations of about one-tenth of 1 percent have been seen several times by an experiment aboard the Solar Maximum Mission satellite. These fluctuations in solar radiation correspond to a change of up to 10 degrees Celsius in the Sun's average temperature of about 5,700 C.

The newly-measured changes in the Sun's output of energy may be related to sunspot or solar flare activity, according to meteorologist and physicist Dr. Richard C. Willson of the Jet Propulsion Laboratory, who developed the instrument to measure the Sun's radiance for the Earth-orbiting satellite.

The instrument, called an Active Cavity Radiometer Irradiance Monitor, one of seven experiments on the satellite, is capable of detecting changes in the Sun's release of energy as small as one thousandth of 1 percent. The instrument measures a very broad range (X-rays to radio waves) of the radiation that falls on top of Earth's upper atmosphere. This represents well over 99.9 percent of the total solar radiation reaching Earth.

Theoretically, an increase or decrease in the Sun's release of energy—as little as 0.5 percent per century—can produce profound changes in Earth's climate. It is estimated that a drop of only 1 percent in the Sun's output of radiation would decrease Earth's mean global temperature by more than 1 degree C. The entire Earth would be covered with ice if the Sun's radiation decreased by only 6 percent.

There is evidence that the Earth has been growing colder for about 90 million years, and scientists believe the average global temperature may drop 10 or more degrees in the next several million years. One-hundred-fifty million years ago, Earth was approximately 8 degrees C warmer than it is today. Since then, numerous warming and cooling climate cycles have occurred. These cycles, which occur with frequencies ranging from 22 years to millions of years, have caused ice ages, ranging in severity from major glacial epochs to "little ice ages."



More Solar Flares—The arrow points to an unusual "corkscrew-like" streak of hydrogen bursting from the Sun's surface during an investigation by the Solar Maximum Mission. The orbiting laboratory is providing unprecedented information on changes in the Sun and its energy.

The last "little ice age," which began in the mid-17th century and lasted through the mid-19th century, was marked by a one-and-a-half degree drop from the present mean global temperature of about 14 degrees C. This slight change in the Earth's average temperature resulted in an observable increase of glaciation in the Alps.

The Solar Maximum Mission satellite, launched into a 575-kilometer orbit above Earth last February, is managed for NASA's Office of Space Science by the Goddard Space Flight Center.

The spacecraft's observations are part of NASA's solar monitoring program, now focused on studying the Sun during the Solar Maximum Year—a 19-month period when sunspot activity, which rises and falls in an 11-year cycle, is at a peak. Additional flights of a similar device, again supplied by Dr. Willson, will occur as part of NASA's Spacelab program. The latter will be carried into space aboard the Space Shuttle, beginning in the early 1980s.

Aircraft Emergency Signals Improved

NASA researchers believe they have solved some of the problems of general aviation aircraft distress signal equipment, in which six of every seven systems failed to transmit following a plane crash and approximately 75 percent of all distress signals were false alarms.

The systems, known as emergency locator transmitters, emit a radio beacon, on a specific frequency designated for emergency use, to locate downed aircraft and are supposed to be activated by the impact force of a crash.

Researchers at Langley Research Center assisting the Federal Aviation Administration through the Radio Technical Commission for Aeronautics, think they may have an answer to at least one of the activation problems.

The trouble lies in the self-contained, battery-powered radio beacon's sensor switch. In some cases the switch has proven too sensitive to normal aircraft vibrations while, in other instances, the switch was not sensitive enough to crash forces.

To activate the radio beacon on impact, the sensor switch must "feel" a force of five times gravity for more than 11 milliseconds. High-frequency vibra-

tions where the beacon is mounted, however, can make and break the contact more rapidly than the 11 milliseconds, allowing the device to ride through a crash without activating.

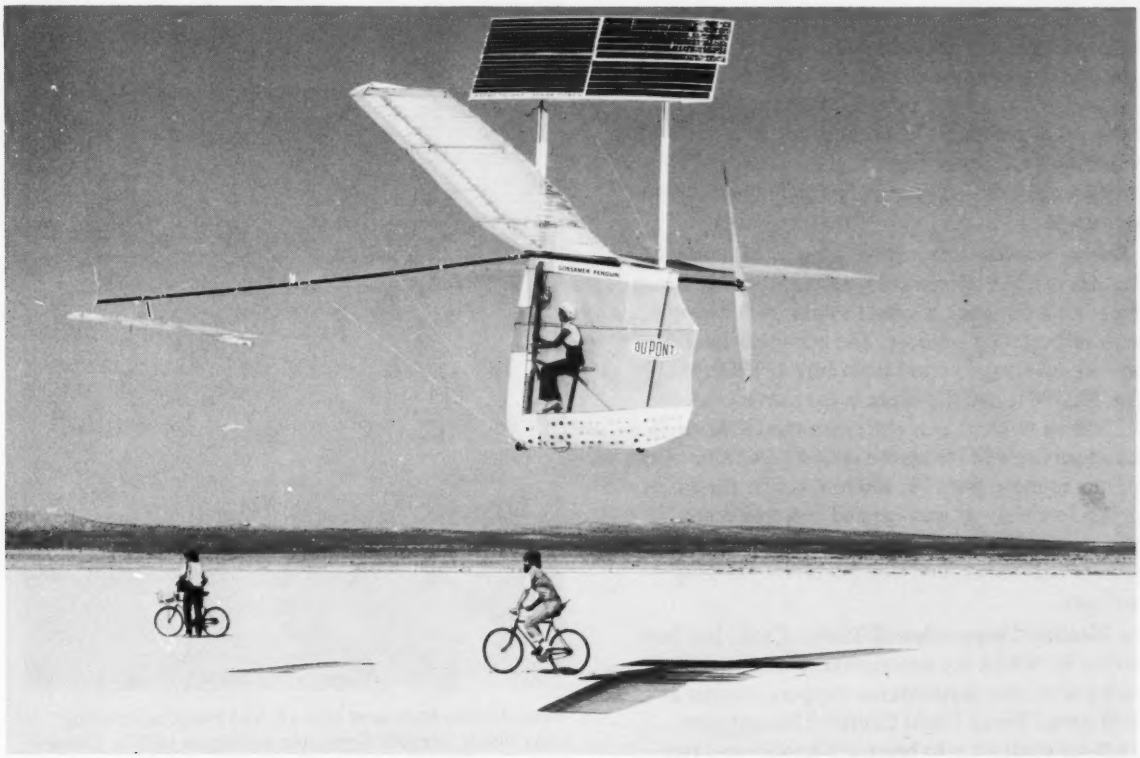
Somewhat lower frequencies may cause false alarms, but even lower frequencies are present during a crash. Scientists have built an experimental switch sensitive to low-cycle vibrations out of the range of normal aircraft vibrations and closer to the low-cycle, pulse-like force of a crash.

Huey D. Carden, an aerospace engineer at Langley, designed the modification and tested it. The device was attached to various places inside a section of tail cone from a light airplane, which was in turn, inside a protective cylindrical section. The entire 907-kilogram assembly was dropped several feet into a .6-meter depth of glass beads, subjecting the sensor switch to forces as high as 16 times gravity. The same procedure, as well as crash tests using actual aircraft, was initially used to evaluate the problem with the locator beacon.

Carden made his report to a special committee of Radio Technical Commission in August. The Commission, in turn, will recommend to the Federal Aviation Administration and industry an improved second generation of locator beacons for production as early as 1983.

The special committee is examining two other areas: where the beacons were or were not useful, and the performance of the beacons as a total system. The latter group has already determined that antenna location in a downed aircraft strongly influences the range over which the distress signal can be detected.

The committee's expected contributions to better performance of the emergency locator will also aid operation of NASA's planned series of search and rescue satellites. Experimental hardware for SARSAT, as the system will be called, will be flight tested on another satellite in 1982. The system is designed to instantly process many distress signals and locate each signal source to within 10 kilometers. Reducing the number of false locator beacon transmissions will allow the system to operate more efficiently.



Direct Solar Flight—The Gossamer Penguin soars over the flat surface of Dryden Flight Research Center, without storage batteries and relying solely on solar power. The 68-pound aircraft has a bank of 2800 protovoltaic cells mounted above the wing and they convert light from the Sun into electricity to power the propellor. Janice Brown is at the controls.

A Working Day—Johnson Space Center employee Shirley Price parks her car and prepares to walk to her office in the Project Management Building. Totally independent, the 34 year old woman has been without arms since birth. She does her own housework and personal grooming, and she can type with her toes. Employed in the JSC Personnel Office, Ms. Price is a former recipient of the National Handicapped Woman of the Year Award.

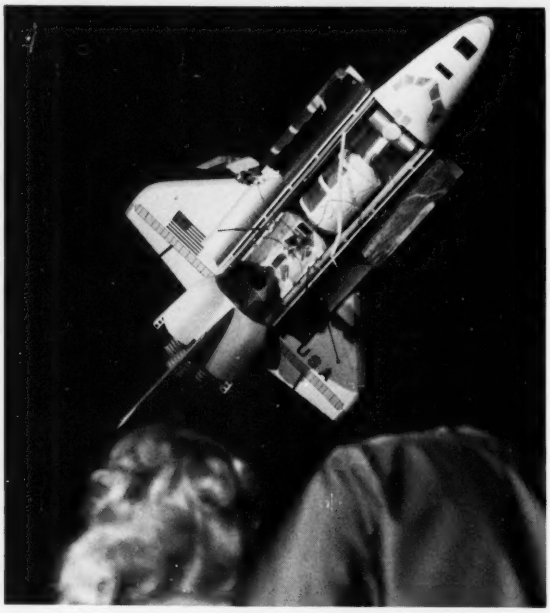
Contractor News

McDonnell Douglas Corporation, McDonnell Douglas Astronautics Company, 530I Bolsa Avenue, Huntington Beach, Calif., has been awarded a letter contract for long lead time materials for six Delta space vehicles plus related spares. The value of the letter agreement approximates $14 million and will be negotiated as a fixed price incentive contract. Technical direction of the Delta program is performed by the Goddard Space Flight Center under the overall direction of NASA's Office of Space Transportation Operations.

Boeing Services International, Inc., Cocoa Beach, Fla., has reached agreement with the Kennedy Space Center on a one-year contract extension for supply and transportation services. The cost-plus-award-fee contract covers the period from July 1, 1980, to June 30, 1981, and the figure is over seven and one half million dollars. This extension marks the third year of service and brings the cumulative value of the contract to more than $22 million. Under the terms, Boeing Services will manage and perform supply support operations and services, transportation management operations, and transportation planning functions.

The Mercury Corporation of Tustin, Calif., has been selected by NASA for negotiation of a contract dealing with base maintenance support services at the Marshall Space Flight Center. The cost-plus-award-fee contract is to begin in October and run for one year with two one-year options. Estimated three-year value of the contract would be $21 million.

Meals in Orbit—Not a busy housewife packing Johnny's lunch, she is Astronaut Rhea Seddon. At the Johnson Space Center, she is assembling food items for the portable food warmer to be used on Shuttle trips which have no galley (orbital test missions). The food warmer heats by conduction and will be attached to a locker door in the mid-deck area of the orbiter.



Visual Effect—With most of the NASA facilities reporting heavy visitor turnouts, September activiies at LeRC's Visitor Information Center featured this handsome Shuttle model. The orbiter, 8-feet, in length, has its cargo bays open, showing Spacelab tucked inside.

Patents for Inventions from NASA Research

The office of General Counsel, NASA Headquarters, announces that the following U.S. patents have been issued by the U.S. Patent Office to NASA for inventions resulting from NASA research. Inquiries concerning them should be directed to the attention of the NASA Patent Counsel of the indicated installation.

Inventor(s) & Employer	Title	Patent No.	Installation
Donald G. Beremand, NASA/Lewis	Free-piston regenerative hot gas hydraulic engine	4,215,548	LeRC
Hossein Bahiman, NASA/GSFC	Belt for transmitting power from a cogged driving member to a cogged driven member	4,215,590	GSFC
John A. Calvert, NASA/MSFC	Redundant motor drive system	4,215,592	MSFC
Samuel Berkman, Kim Kyong-Min Harold E. Temple, RCA Corp., David Sarnoff Research Center, Princeton, N.J.	Means for growing ribbon crystals without subjecting the crystals to thermal shock-induced strains	4,216,186	NRO/JPL
Theodore F. Cizek, IBM Corp.	Method for growing a ribbon crystal particularly suited for facilitating automated control of ribbon width	4,217,165	NRO/JPL
Charles E. Hermesmeyer Motorola, Inc., Phoenix, Ariz.	Method and apparatus for quadriphase-shift key and linear phase modulation	4,216,542	NRO/JPL
Warren H. Philipp, Charles E. May Li-Chen Hsu, Dean W. Sheibly, NASA/LeRC	Method of cross-linking polyvinyl alcohol and other water soluble resins	4,218,280	LeRC
Michael J. Mirtich, Jr., James S. Sovey Robert F. Roman, NASA/LeRC	Hydrogen hollow cathode ion source	4,218,633	LeRC
I-Ping Yu, Lockheed Electronics Co., Inc. Houston, Tex.	Multiple band Circularly polarized microstrip antenna	4,218,682	JSC
Ellis Haynes, Jr., Rockwell International Corp., Space Systems Group, Downey, Calif.	Coaxial phased array antenna	4,218,685	JSC
Walter J. Matzen, Texas Instruments, Inc., Dallas	Apparatus for measuring semi-conductory device resistance	4,218,650	NRO/JPL
Norris C. Gray, Robert M. Senseny Philip N. Bolton, Boeing Aerospace Co., Seattle	Penetrator nozzle	4,219,084	KSC
Allen G. Ford, Caltech/JPL	Speed control device for heavy duty shaft	4,219,107	NRO/JPL
William A. Oran, Leroy H. Berge Donald A. Reiss, Jerry L. Johnson, NASA/MSFC	Method and apparatus for shaping and enhancing acoustical levitation forces	4,218,921	MSFC
John Bellavia, Jr., John O. Kane Rockwell International Corp., Space Division, Downey, Calif.	Thermal barrier pressure seal	4,219,203	JSC
James B. Stephens, Caltech/JPL	Low cost cryostat	4,218,892	NRO/JPL
Arthur A. Rudmann, NASA/GSFC	Device for coupling orbiting space vehicles	4,219,171	GSFC
Manuel A. David-Malig United Aircraft Corporation, United Technology Center, Sunnyvale, Calif.	Method and tool for machining tranverse slot about bore	4,218,941	LaRC
Gordon F. Lund National Research Council, Washington, D.C.	Improved subcutaneous electrode structure	4,219,027	ARC

Launches for 1980

Name	Launch Date	Vehicle	Range	Mission Remarks
FLTSATCOM-C	January 17	Atlas Centaur	ESMC	DOD Navy. Reimbursable.
SMM-A	February 14	Delta	ESMC	NASA. Scientific Solar Maximum Mission.
NOAA-B	May 29	Atlas-F	WSMC	NOAA Weather. Reimbursable. Launch vehicle failed.
GOES-D	September 9	Delta	ESMC	NOAA Weather. Reimbursable.
SBS-A	October	Delta	ESMC	Satellite business systems. Reimbursable.
FLTSATCOM-D	October	Atlas Centaur	ESMC	DOD Navy. Reimbursable.
Navy 20	November	Scout	WSMC	DOD Transit. Reimbursable.
Intelsat V-A	November	Atlas Centaur	ESMC	Intelsat communications. Reimbursable.

Did You Know?

The last member of the famed "von Braun team" has left the Marshall center. Gustav A. Kroll retired in July after working on projects at Huntsville since 1950. Kroll arrived in the United States with the 118-member von Braun rocket group in 1945 and lent his talents in structure to all the major Marshall projects—Redstone, Jupiter, Saturn, Shuttle. Mr. Kroll and his wife will stay in Huntsville; that, to the Krolls, is home.

The Lewis center and Case Western Reserve University have completed their 17th year of the Faculty Fellowship Program. This year, thirty-one professors from colleges and universities across the country studied at the ten-week program, all under the auspices of the American Socity for Engineering Education. Under the program, academicians are given the opportunity to work side-by-side with NASA researchers on a wide variety of projects.

Clarice Lolich, aerospace education specialist, has been named Teacher Educator of the Year by the American Society for Aerospace Education. A visiting assistant professor with Oklahoma State University, Ms. Lolich travels as an aerospace lecturer representing NASA in the Western United States. She is based at Ames Research Center.

Idea Clearinghouse, the voluntary NASA Headquarters program to publicize operations improvements, has gotten a good response from various centers. To keep that ball rolling, Activities lists below the idea program coordinator at each installation with the phone number.

At	*Contact*	*Ext.*
ARC	John McDermaid	5667
DFRC	Bud Merritt	8457
GSFC	Pat Kelly	8494
JSC	Merv Hughes	5228
KSC	Raymond Cerrato	2780
LaRC	William Simkins	3511
LeRC	Mike Hoyman	6694
MSFC	Leroy Osborn	0600
NSTL	Tom Worthington	2000
WFC	J. C. Floyd	5581
Headquarters	James Darraugh	755-3219

For more information, contact Headquarters Information Systems Division (NSM-12).

Hurricane by Satellite—The immensity of Hurricane Allen is shown clearly in this photo taken on August 8 by a NOAA meteorological satellite designed by NASA. After devastating wide areas of the Caribbean, Allen is barreling toward the Texas coast. The storm covers almost the entire area of the Gulf of Mexico. The satellite picture also captures a hurricane named Isis, which was on the rampage in the Pacific at the same time. Note the simplicity of weather patterns across the United States—barely a cloud overhead anywhere—as the nation suffered through this summer's prolonged heat spell.

Another Dividend from Air and Space

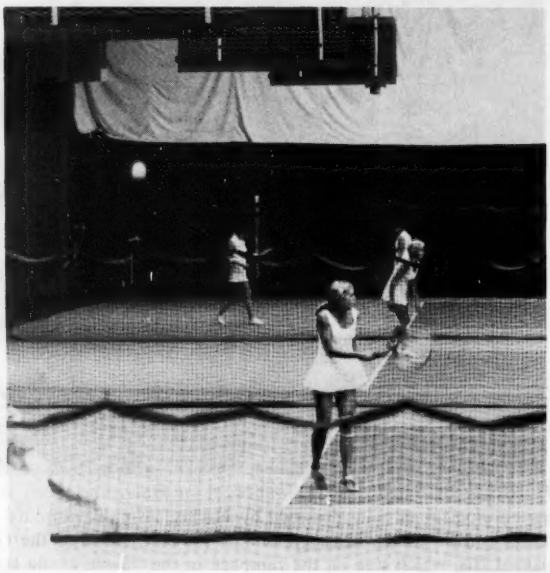
Research and development in aeronautics and space have provided numerous benefits for all Americans—and at a tiny percentage of the tax dollar. Here is an example:

Infrared Heaters

In such diverse places as a CVA Lincoln-Mercury shop in Gaithersburg, Maryland, and the Bare Hills Tennis Club in Baltimore, heating units are operating from the ceiling. They are Panelbloc infrared heaters, energy savers which burn little fuel in relation to their effective heat output. Produced by Bettcher Manufacturing Corporation of Cleveland, Panelblocs can be applied to industry and other facilities which have ceilings more than 12 feet high.*

The units do not waste energy because they are not warming the surrounding air. Instead, they beam invisible heat rays directly to objects which absorb the radiation—floors, machinery and people. All of these objects in turn re-radiate the energy to the air.

A key element in the Panelbloc design is a coating applied to the aluminized steel outer surface of the heater. This coating must be corrosion resistant at high temperatures. When the Bettcher company was looking for the right materials to develop such a spray-on paint, it turned to a NASA Industrial Applications Center. NASA responded with pertinent reports on radiator coatings used on spacecraft, including the Apollo Lunar module. Bettcher then set up its own coating facility, at a savings and adding to the radiant efficiency of the company's infrared heaters.



* NASA does not endorse commercial products developed as a result of its Technology Utilization or Patent Licensing Programs, but it does encourage the widest possible use of such technology.

For the benefit of all . . .

NASA
National Aeronautics and Space Administration

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